MOBILE ELECTRONIC DEVICE HAVING RELOCATABLE DISPLAY ELEMENT

BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates to a new slide property of display elements in mobile electronic devices, particularly mobile phones. This feature combines the advantages of flip-type/foldable phones and landscape type phones.

2. Discussion of Related Art

Mobile phones of the so-called flip-type, also known as foldable or clamshell phones, have become rather popular recently. There are certain advantages associated with these phones. The overall area or footprint, in the closed position, is reduced compared to conventional "brick type" or monoblock phones. Also, the display is protected against scratching and the like in the closed position, as it is not exposed, but located on the inside of the housing parts folded together. In the folded open position these phones can provide a larger area for arranging control elements or a big display compared to conventional monoblock phones. Also the distance between microphone and speaker is usually larger than with brick type phones, which can help in enhancing the speech quality, as it usually is better suited for positioning microphone and speaker in the close vicinity of the mouth and ear of a user than in conventional phones.

Other types or form factors of mobile phones have become widely used as well. Particularly in the new gaming consoles, gaming enabled mobile phones like the Nokia® N-Gage™, the landscape form factor is used. This provides the possibility to position the display in the center of the respective device, whereas the control elements, i.e. a keypad, a 4-way rocker key and the like can be positioned on the left and right sides of the housing. In this manner the user is enabled to hold the device in both hands and simultaneously operate for example the 4-way rocker key with the right hand and the other controls with the left hand.

This concept is also applicable to phones having a full keyboard, like in the Nokia cell phone 6810/6820, for giving the user the possibility to type emails, SMS or other messages more easily. While this form factor is well suited for gaming and writing messages it is not as comfortable for speech connections as other (portrait) mobile phones, as such landscape phones must be held in a position rotated 90° in relation to the gaming/writing position. Among other things this entails certain problems associated with the location/orientation of the standard phone keypad or at least the respective key labels, which may cause a certain discomfort for a user. Furthermore this form factor is not suitable for single-handed operation of the respective device, e.g. browsing through the phonebook or reading incoming messages, whereas conventional monoblock and foldable phones do not or at least not suitably enable a landscape usage mode.

The object of the present invention is therefore to provide a variable operating surface for mobile electronic devices or mobile phones combining the advantages of the above mentioned foldable phones and the landscape type phones.

SUMMARY OF THE INVENTION

According to an aspect of the present invention a mobile electronic device is provided, comprising a first housing part, a second housing part and a hinge element connecting the first and second housing parts in a foldable manner. The first and second housing parts and the hinge element form a housing, wherein the first and second housing parts can assume at least

the two following positions: a closed position, wherein the first and second housing parts are closed and facing each other, and an open position, wherein the first and second housing parts are folded apart forming an angle of approximately 180° in relation to each other, or in other words are facing in the same direction. The mobile electronic device may further comprise a display element that is relocatably supported on the housing such that it can—in the open position—be located on either of the housing parts or on the hinge element.

In a device according to the invention the display element can be located in the center of the device when both housing parts are folded open. In this manner a landscape mode can be presented to the user, while the device of the invention otherwise behaves similar to a conventional foldable phone. The advantage of this arrangement relies on the fact that the device can be used both in a portrait mode, for making calls or just reading incoming messages, i.e. single-handed operation, as well as in a landscape mode, for playing games, watching video clips or typing text messages, i.e. a two-handed operation. While the landscape mode can be used for demanding tasks as mentioned before, such a mobile electronic device can still be stored and carried in the closed position, which requires less room and provides for a better protection of both display surface and control elements. A mobile electronic device according to the invention thus combines the advantages of foldable phones with that of landscape type phones in a single device.

In an exemplary embodiment the first and second housing parts can assume one further position, wherein the first and second housing parts are folded apart forming an angle of less than 180° in relation to each other. This enables to assume a configuration being similar to that of conventional foldable phones, where the housing parts are slightly inclined, e.g. in an angle of about 22°. Such arrangement is best suited for making voice calls, wherein microphone and speaker can be positioned near the mouth and ear of the user in an optimum manner. As the display element can be supported such that it is prohibited from being displaced in this configuration, because of the inclined surfaces, the mobile electronic device can be implemented as behaving like a conventional foldable phone.

In an exemplary embodiment control elements are arranged on at least one of the housing parts, which control elements are hidden under the display element when it is located on the respective housing part, and which are exposed to be operable when the display element is located at least partly remote from the housing part. This enables special keys or other control elements (rocker keys, joysticks) to be exposed for operation only in either the landscape or the portrait mode, while keys not being used in a specific configuration can be hidden. User comfort can thus be increased, as only those keys are operable that are actually functional in a mode. This can be achieved by having the display element either cover part or all of only one housing part (in closed or portrait mode), or cover the hinge element and a partial section of the housing part (in open landscape mode). Also, this offers the possibility to locate the display element completely on just one of the two housing parts. In other words, two different (foldable) phone configurations can thus be offered to a user, with different key configurations for example.

In an exemplary embodiment the mobile electronic device includes a camera located in the housing, and the display element is provided with an opening for the camera. As cameras are very common in mobile phones of today this is advantageous. The display element can be implemented such that the camera will be exposed only in a selected mode, e.g.